

2017-16-626

## **Fungicide Alternatives for the Management of Microdochium Patch**

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### **Introduction:**

Previous field trials taking place from 2013 to 2016 have shown great promise in reducing the use of traditional fungicides to inhibit *Microdochium* patch on annual bluegrass putting greens. Products that have previously shown a potential for decreasing the dependency on traditional fungicides have included: the horticulture oil Civitas Defense, phosphorous acid products, sulfur, and iron sulfate. Data from previous work suggests that these products can inhibit *Microdochium* patch, but none of these products used alone have been shown to both inhibit disease and maintain turfgrass quality throughout the trial.

Two field trials are currently underway focusing on finding ways of both inhibiting *Microdochium* patch and maintaining acceptable turfgrass quality. The first trial incorporates the use of Civitas Defense and a phosphorous acid in a seasonal rotation with sulfur and a phosphorous acid. This first trial also includes a timing component that will quantify the effects of a two-week application interval compared to a three-week application interval. The second trial is exploring different rates of iron sulfate in combination with a phosphorous acid on a two-week application interval. Both trials are subjected to replicated golfer traffic (76 golf rounds a day) in order to mimic real-world conditions and to better assess the impact of the treatments on turfgrass recovery from traffic and overall turfgrass quality.

At the conclusion of these trials, an integrated pest management (IPM) program will be developed based on the results of these trials and made available to turfgrass managers.

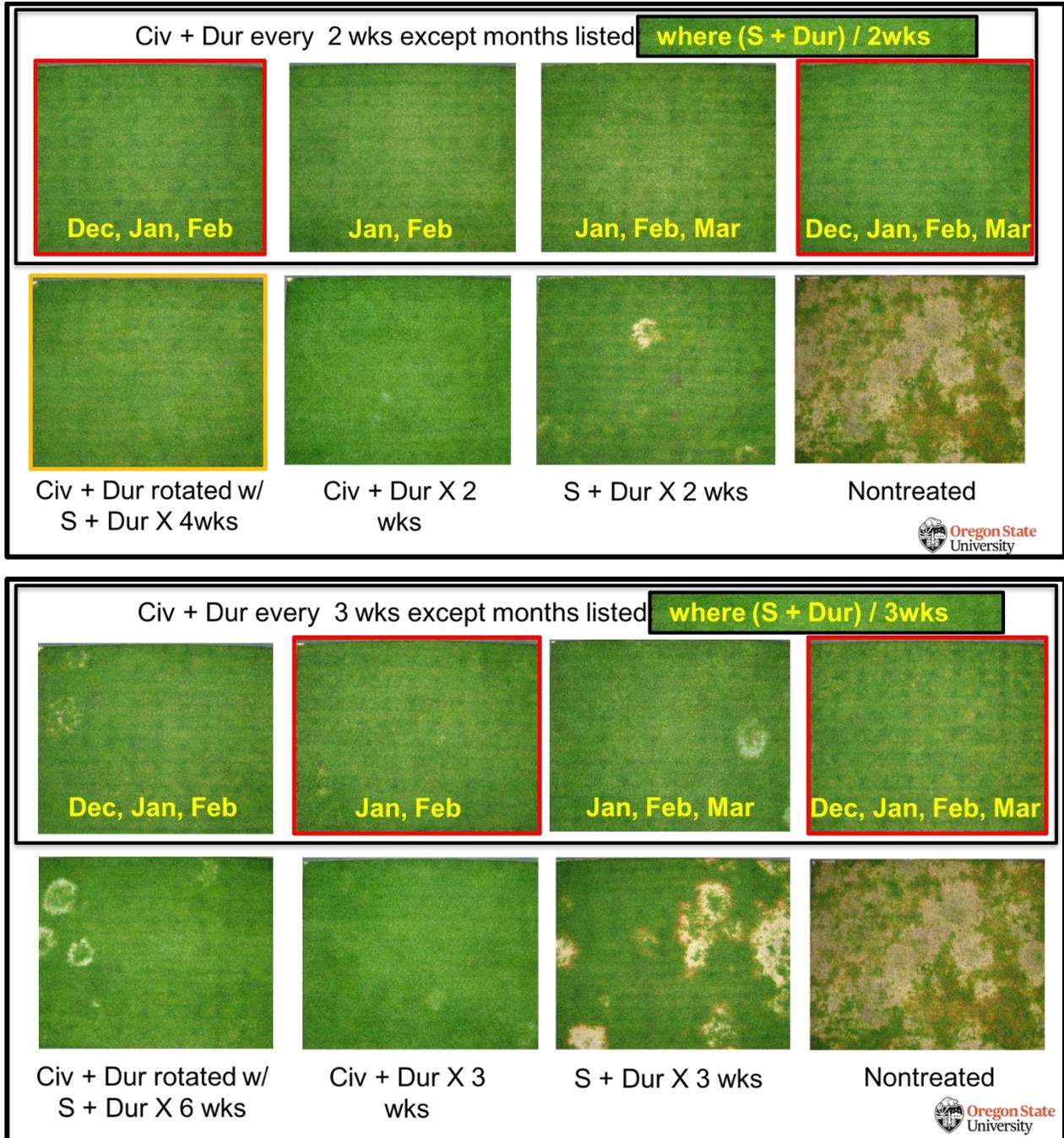
### **Experiment 1:**

#### **Civitas Defense & phosphorous acid in rotation with sulfur and phosphorous acid**

The field trial began on September 29, 2016 and final data collection for year one was taken on April 30<sup>th</sup>, 2017. The second-year trial replication began on September 28, 2017 on a new area of the same green and will conclude on April 30<sup>th</sup>, 2018.

#### **Preliminary observations:**

First year observations indicate that a 2-week application interval will provide a greater expectation of disease inhibition compared to a 3-week application interval (Image 1). There is also some indication that turfgrass quality is greater when Civitas Defense + phosphorous acid applications are avoided during the coldest part of the winter (Dec, Jan, and Feb).



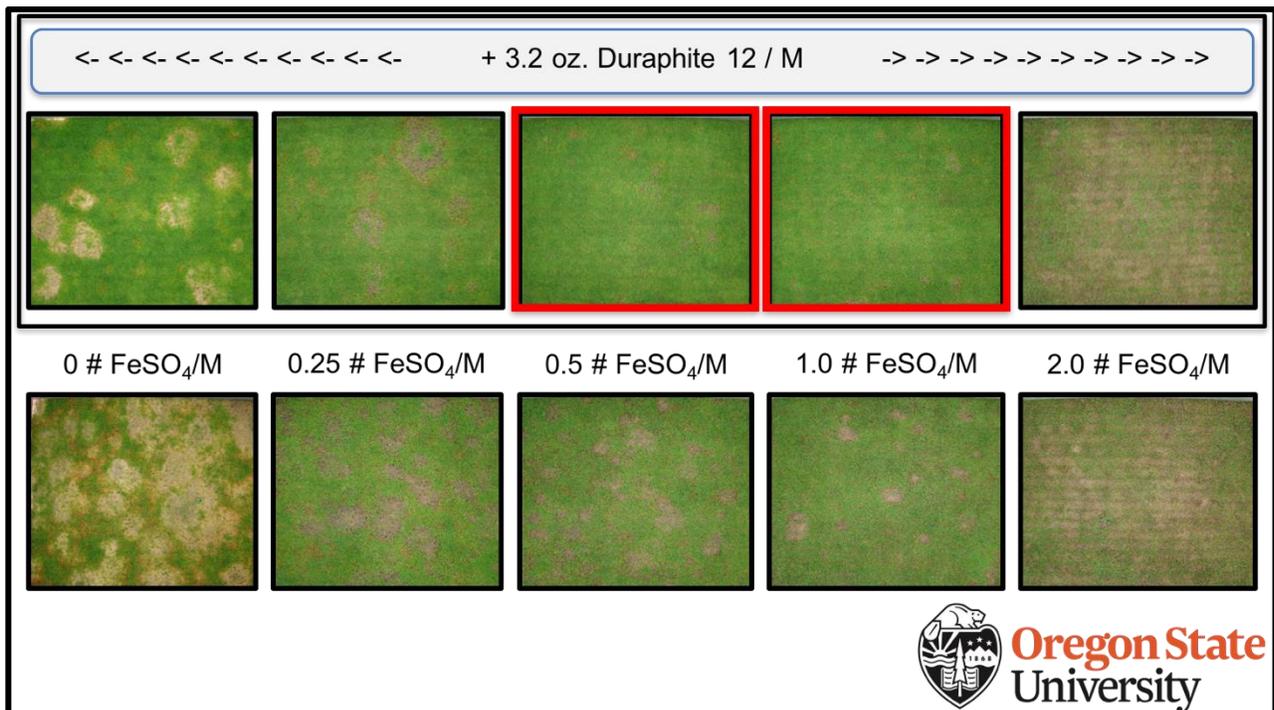
**Image 1:** Appearance of plots affected by treatments on a 2-week application interval (Top box) and a 3-week application interval (Lower box) on the incidence of *Microdochium* patch on an annual bluegrass putting green in Corvallis, OR. The field trial began on September 29, 2016 and final data collection for year one was taken on April 30<sup>th</sup>, 2017. Top row of each box received treatments of Civatas Defense (Civ) at a rate of 8.5 oz./M in combination with Duraphite 12 (Dur) at a rate of 3.2 oz./M except during the months listed in yellow. During the months listed, Sulfur DF (S) was applied a rate of 0.25#S/M in combination with Duraphite 12 at a rate of 3.2 oz./M. The bottom row includes treatments applied at the frequencies indicated of a Civatas Defense + Duraphite 12 rotated w/ Sulfur + Duraphite 12, a Civatas Defense + Duraphite 12 treatment, a Sulfur + Duraphite 12 application, and nontreated control plot.

**Experiment 2:****Iron sulfate rates & phosphorous acid**

The field trial began on September 29, 2016 and final data collection for year one was taken on April 30<sup>th</sup>, 2017. The second-year trial replication began on September 28, 2017 on a new area of the same green and will conclude on April 30<sup>th</sup>, 2018.

**Preliminary observations:**

First year observations indicate that as rates of iron sulfate increase, inhibition of *Microdochium* patch tends to increase (Image 2). Higher rates of iron sulfate also tend to lead to greater turfgrass thinning and lower turfgrass quality ratings. In addition, there is an indication that phosphorous acid applications tend to decrease the incidence of *Microdochium* patch and that there may be a benefit from applying phosphorous acid in combination with iron sulfate on disease inhibition and turfgrass quality.



**Image 2:** Appearance of plots affected by treatments of different rates of iron sulfate (FeSO<sub>4</sub>) applied either in combination with Duraphite 12 at a 3.2 oz./M rate (top row) or in absence of a Duraphite 12 application (bottom row) on the incidence of *Microdochium* patch on an annual bluegrass putting green in Corvallis, OR. The field trial began on September 29, 2016 and final data collection for year one was taken on April 30<sup>th</sup>, 2017. Treatments applied on a two-week application frequency.